



Preliminary Perspectives on Undergraduate Research in Egypt

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BACKGROUND

The higher education landscape in Egypt is a massive, bustling and rugged place, yet one holding promise for growth and yield. The Ministry of Higher Education and Scientific Research's (MoHESR) 2018 statistics list 27 public universities (including the Islamic Azhar University, which alone has 26 branches), private universities, and 188 technical, nontechnical and vocational colleges—the later are non-university degree-awarding higher education institutions. The number of undergraduate students enrolled in all departments in 2018 totaled 2,901,209 (*Manzūmat 2018*). Such high numbers of youth capital promise great potential. Despite various campus challenges—such as over-enrollment, underfunding, and dilapidated facilities in public universities, and soaring tuition costs in private universities—there are multiple examples of undergraduate student engagement and inquiry on Egyptian campuses. Some of these examples are intentionally

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enabled by supportive university structures, others are driven by students or faculty mentors. This chapter provides a brief overview of multiple university successes, followed by a detailed case analysis of the American University in Cairo (AUC), a private liberal arts institution with an evolving infrastructure for supporting and expanding undergraduate research. These developments are placed, where appropriate, in the context of the relevant Arabic and English published scholarship on undergraduate research.

Undergraduate Research in Egyptian Public Universities

Various conceptions of research exist in the literature, offering different frameworks to understand how universities approach and integrate undergraduate research within their structures. The experience of Egyptian universities in recent years is examined, here, specifically within Angela Brew's model (2003).

In 2019, Egypt articulated national strategic goals for the advancement of higher education and research, outlining a number of achievements and initiatives that focus on the development, modernization, and rank-enhancement of Egyptian universities, and on the strengthening of student competencies and career preparedness, especially in the areas of entrepreneurship and development-oriented creative problem-solving (*Al-Khutta al-Tanfidihiyya* 2019). The years 2017–2019 offered opportunities for engaging young scholars and policy makers together in dialogue and strategic planning. A World Youth Forum was organized in the coastal city of Sharm el Sheikh, both in 2017 and 2018, inviting thousands of young people from over 100 countries to participate in discussion of global issues, largely with a vision to forward the United Nations Sustainable Development Goals. In April 2019, the first Global Forum for Higher Education and Scientific Research (GFHS) was, also, held, with the “intention of conducting insightful action-oriented discussions and attaining wide-ranging perspectives for the purpose of envisioning the next 10 years of Higher Education and Scientific Research in a global, interconnected, and borderless world context” (GFHS 2019). Instituting opportunities to support undergraduate inquiry and experiential learning was part of the discussion.

While there is no articulated definition or national strategy for developing “undergraduate research” pedagogies and structures, the term “action-oriented” may be a keynote, defining not just the discussions on educational reform, but the type of research planned for and expected of university students. The World Youth Forum, the Global Forum for Higher

Education, and the Ministry strategy place emphasis not on “an original intellectual or creative contribution to the discipline,” as is the Council on Undergraduate Research definition, but on an original *solution to problems* in the external physical environment. There is barely any reference in the language of the Global Forum agenda and the MoHESR goals to engagement in research in the sense of analyzing the complexity of concepts, questioning theory, understanding the nature of disciplinary knowledge, or participating in the construction of knowledge. The emphasis comes from a business/industrial discourse, employing terms such as “innovation,” “industrial revolution,” “emerging technologies,” “global challenges,” “digitalization,” and “leadership.”

These opposing conceptions of research are neatly interpreted by Angela Brew’s (2003) model of research. Brew offers an interesting categorization of research, mapping the relationship between research and teaching in quadrants, based on whether the priority of the research is the external product or internal process, and whether the researcher is the focus of the process or not.

Table 5.1 illustrates Brew’s model.

Brew explains each of the “views,” concluded from a qualitative study that analyzed interview responses from 57 Australian educators, as follows (2003, 6–7):

- Within the external dimension, expectations are “external to the process of doing research.” The Trading view prioritizes products that focus on the advancement of the researcher, such as grants and published papers. The Domino view prioritizes products that “push the frontiers of knowledge” such as answers or solutions to complex issues. The researcher is not the focus.
- Within the internal dimension, expectations “look inward.” The Journey view prioritizes the researcher’s “transformation” and

Table 5.1 Brew (2003, 6)

Research is oriented towards	Research aims to	The researcher is present to, or the focus of, awareness	The researcher is absent from, or incidental to, awareness
External products	Produce an outcome	Trading view	Domino view
Internal processes	Understand	Journey view	Layer view

“journey of discovery.” The Layer view prioritizes the meaning-making, and the creation of “reliable, systematic information.”

The action-oriented philosophy, therefore, that guides undergraduate research engagement in most Egyptian universities, may be interpreted within Brew’s external *Domino* view, where the focus is on solving problems and addressing local and global issues. Researcher development is not the focus; nor is the *process* of research and critical inquiry. The important outcome is the significance of the *product*. This is not a new vision. Even historically, despite dire conditions of the educational and physical infrastructure for research in public universities, it is undergraduates in the applied disciplines of the natural sciences, engineering and architecture, computer science, agriculture, dentistry, and media studies, amongst others, who have long been required to submit a research-based graduation project, offering a new mechanical technique, solution, or innovation. Each of these disciplines normally offers a capstone research methods course, where groups of students engage in their first and/or most significant experience with hands-on research, mostly mentored by teaching assistants (TAs). Most students work with meager self-funded (usually parent-funded) resources, scarce essential materials and equipment, often oversized groups of varied competencies, and limited access to key information sources. Despite these limitations, the students persevere and work diligently, building autonomy and agency, often winning global competitions for scientific innovations, computer applications, robotics, and other technical and business advances. Examples of such competitions include Alexandria University students winning first place at the European Union Competition on Entrepreneurship Awareness (Eldeeb 2019); Cairo University students ranking highest in the first phase of the Design/Build/Fly competition of the American Institute of Aeronautics and Astronautics (*Cairo University Aerospace* 2018); and Mansoura University geology students participating in the discovery of the skeleton of a dinosaur, which the international research team termed *Mansourasaurus*, in the Egyptian Western Desert (Sallam et al. 2018).

With the new Ministerial strategic plan, universities now take an active role in fostering and supporting undergraduate research. The bigger universities, such as Cairo University, Ain Shams, Alexandria, Tanta, Suez Canal, Assiut, and others, offer funding for research and student travel, as needed. Some, including the Ministry of Defense Military Technical College, organize an annual undergraduate research conference. A faculty

member from each of three public universities—Mansoura, Beni Suef, and Zagazig—was interviewed for further detail on the institutional undergraduate research support effort of their respective universities.

Located in the Dakahlia Nile Delta, Mansoura University, established in 1972, and currently hosting 165,000 undergraduates (Mansoura University 2019) is an example of a university that has adopted an intentional strategy for “developing the student’s personality to be capable of innovating, challenging, self-learning, working in a team and competing regionally and globally” (Strategic goals 2012). It recently established a Student Research and Innovation Office (SRIO). Housed under the Vice President of Education and Student Affairs, the SRIO offers partial funding for student research projects, and organizes discipline-specific student conferences, mostly in the pharmacology and engineering departments, in addition to an annual conference for student initiatives, co-organized by the students. Once again, most projects are graduation capstones in the technical disciplines, geared toward environmental, science, and business solutions. The office also facilitates supplementary funding for student research through the Technology Innovation Commercialization Office (TICO). This is an intellectual property and technology transfer office, established in cooperation with the Egyptian Academy of Scientific Research.

Beni Suef University, home to 50,000 undergraduate students (Beni Suef 2019), adopts a different undergraduate research approach, placing student research within the purview of community engagement. Research is perceived as a civic skill, and developed for the purpose of building the local community and environment. Student–faculty research partnerships are developed within the science departments, not through a centralized office across the university. All student research activity is overseen by the Vice President of Community Engagement and Environmental Development. Beni Suef University, also, hosts an Institute for Small and Medium Enterprise, which engages both faculty and students. In an interview with a student mentor, Dr. Mostafa Ragab Abdel Wahab, lecturer and researcher in the College of Sciences, cited a number of articles that were the product of mentored community-based research, and coauthored by undergraduate researchers alongside faculty. Adopting the external Domino view of research (Brew 2003), the Beni Suef model further narrows its target beneficiary of student research. Students work to address and directly serve community needs through their research and service, fulfilling the “public purpose” of undergraduate education (Munck et al.

2014, 1). However, unlike the Western discourse on community “equal partnership” (29), which depicts a business-like reciprocal relationship between two entities, the Beni Suef student researchers identify with community. The environment surrounding the university and receiving the “product” of their research is their home, their families, and neighborhoods. The relationship is not one of “partnership” but of organic belonging.

Other less-funded universities, such as Zagazig University, depend on faculty-initiated projects and partnerships. Assistant Professor of Industrial Engineering and Management, Noha Mostafa, reports that students have participated, through a partnership with the Ma‘an Arab University Alliance for Civic Engagement (Ma‘an)—a university network which is housed by the American University in Cairo—in a research competition, presenting solutions to corporate and industry-posed problems, and winning opportunities and sponsorship for implementation. Some students have also published in undergraduate conference proceedings, managed by the Military Technical College.

In the realm of private universities, three new higher education institutions stand out as being research-directed at the undergraduate level—Nile University, the Egypt-Japan University for Science and Technology (E-JUST), and Zewail City of Science and Technology. Nile University describes and positions itself as “Egypt’s Research University.” It offers bachelors programs only in business and applied sciences, articulating a research strategy that addresses key strategic priorities in Egypt—health-care, agriculture and crops, traffic and vehicles, energy and water, software and communications, social applications, and innovation, entrepreneurship, and competitiveness. Its strategy for undergraduate education is articulated as follows: “Students have to hone their skills, search for knowledge and find it for themselves, their role is to question conventional wisdom, investigate it, challenge it and try to improve on it. Faculty’s role at NU is to guide, coach and support students in their search for knowledge” (Nile University 2019). E-JUST’s research vision emphasizes “introducing effective and efficient research output that is relevant to global trends and meets national priorities” (2019).

In a similar vein, Zewail City of Science and Technology, described as a “National Project for Scientific Renaissance,” invests in research and technology that address “strategic challenges on the national and international level. [It aims] at providing new inventions that will contribute effectively in developing societies and enhancing economies” (University Vision

2015). Zewail City University offers undergraduate programs only in Engineering and Science, and administers a “STEM” entrance examination to its applicants. Students work on interdisciplinary hands-on projects, linked to industry, and take a course on intellectual property, technology transfer, and commercialization. The entire pedagogical strategy for undergraduate education is based on immersion in the research process and engaging in problem-oriented scientific inquiry.

It is interesting to observe that while E-JUST and Zewail City embrace the Domino view in Angela Brew’s (2003) research framework, focusing on “outputs,” “national priorities,” “strategic challenges,” and “inventions,” Nile University adopts the Layer view, focusing on the internal growth of the student researchers, using phrases that express the development of research skills and meaning-making—“hone their skills,” “question conventional wisdom,” “investigate,” “challenge,” and “improve.” All three universities have formed a coalition, together with the American University in Cairo, known as CUREE—the Coalition for University Research Excellence in Egypt (El Gendy 2019). The coalition seeks to advance and lead faculty and student research achievements.

Egyptian universities, then, especially in the technical fields, are shifting from a knowledge-based to an outcomes-based, or more accurately, a product-based higher education. The new vision perceives the student as a productive agent of change, rather than an intellectual, discerning scholar, engaged in theory analysis and conceptual critique, and asserting authorship (Grobman 2009). It is not “contribution to the discipline” (Council on Undergraduate Research) that is the key characterizing factor of student research, but “technical solution,” “entrepreneurial initiative,” or “contribution to (global) development.” This approach is largely driven by young lecturers, assistant and associate professors who are inspired, inspiring, and passionate about supporting student learning and empowerment. The students develop skills in problem analysis, “original” solutions, and innovation. This is in line with undergraduate experiences in other contexts, where economic development is the primary driving force for student research and workplace preparation (Van Galen et al. 2015).

UNDERGRADUATE RESEARCH AT THE AMERICAN UNIVERSITY IN CAIRO

The American University in Cairo (AUC) is a private, nonprofit institution, accredited by both the American Middle States Commission for Higher Education and the Egyptian National Authority for Quality Assurance and Accreditation in Education (NAQAEE). The 2019 figures show that AUC served a population of 5474 undergraduates, as well as 979 graduate students, bringing an American liberal arts philosophy of education and core curriculum to a 95% Egyptian cohort of students, at a faculty-to-student ratio of 1:11. The case of the AUC is presented here, given its intentional and strategy-driven approach to undergraduate research, based on the American model of undergraduate research as a high-impact practice. The definition of high-impact practices adopted by the university comes from the Association of American Colleges and Universities (AAC&U), specifically the work by George Kuh (2008). Kuh outlines six conditions for high-impact “unusually” effective educational practices: they require “considerable” time and effort; they immerse students in activities where they have to interact with faculty in “substantive” ways; they promote diversity; they provide rich and frequent feedback to students; they enable learning outside of the classroom; and they are transformative, often life-changing (14–17). AUC purposefully designs student research experiences to achieve these conditions.

In ways much similar to the Egyptian universities, AUC’s undergraduate students in the technical fields of the sciences and engineering have always had a thesis exit requirement, in contrast to their business and humanities/social sciences counterparts. Course-embedded research, however, has been inherent in the humanities and core general education curricula, with instruction of basic research writing mandatory in the first year writing courses. These include skills such as the formulation of a debatable research question, identification of scholarly sources, critical analysis of literature, becoming aware of the audience and the rhetorical situation, developing a sound argument with logical organization, adopting effective strategies of persuasion, and documenting sources with integrity. In the second, third, and fourth years, many of the disciplines, though not all, offer a course or more in specialized research methods. Every student on campus, also, regardless of discipline, is required to fulfill two capstone courses—one in the department of their major, and one outside

the major. The learning outcomes always include a research-intensive capstone project. These are the curricular, credit-based offerings.

Co-curricular research activity began sporadically, with individual faculty members or student organizations organizing public presentation events. In 2004, two faculty members in Rhetoric and Composition, organized the first institution-wide Undergraduate Research Conference, under the theme of “Reform in Egypt: Opportunities and Challenges.” The students participated in the conceptualization, organization, marketing, and recruitment for the conference, inviting four distinguished keynote speakers, both AUC faculty and invited guests. Over 50 undergraduate participants presented engaged, well-supported and nuanced research. The conference was hugely celebrated on campus, by both students and senior administration. The organizers collected the student papers, reviewed and edited them, and posted them on the departmental webpage, creating the beginnings of an online publication.

In the following year, 2005, the presentation event developed into the annual conference for Excellence in Undergraduate Research, Entrepreneurship and Creative Achievement (EURECA). A series of faculty-facilitated workshops were given on campus, ranging from “How to Write an Abstract” to “How to Give a Presentation.” With the approval of a committee of reviewers, more than 70 students from various disciplines presented their research work in either oral and poster formats, and the ensuing publication officially became URJe—The Undergraduate Research Journal. The idea of student scholarship was born. URJe is now a registered open access publication, hosted on Open Journals System (OJS), and listed in the CUR Undergraduate Journal Catalog.

Over the following years, the conference grew to integrate applicants from other Egyptian universities, and, on a small scale, international applicants. New activities were also introduced to showcase all creative, research-based projects across the curriculum, and to integrate students starting from the pre-credit language instruction courses, through the first-year mandatory research-writing courses, and to the final graduating seniors’ thesis-level work. The following became the subcomponents of EURECA:

- Research Excellence Across the Disciplines—oral presentation panels for students in the majors
- First-Year Research Experience (FYRE)—oral presentation panels for freshman students

- ELI Explorers—oral presentation panels for pre-credit language students
- Undergraduate Poster Competition—research poster presentations for undergraduates at all levels
- Creatopia—presentations of original creative works, including:
 - Creative writing, script-writing, spoken word poetry
 - Short film, documentary, podcasts
 - Visual artwork and photography
 - Graphic design
 - Cartooning and graphic novels
 - Creative game design
 - Musical compositions
 - Digital Liberal Arts projects
- Entrepreneurship Expo—for undergraduate business ideas and startups
- Architectural Design Show—for undergraduate design innovations

It took almost eight years for the university to finally institutionalize co-curricular undergraduate research. A new Academy of Liberal Arts (ALA) was established in 2012, to house the general education core curriculum, the non-degree awarding departments of English Language Instruction, Arabic Language Instruction, and Rhetoric and Composition, and the high-impact academic support programs. A place (and space) for an Undergraduate Research Program was, thus, created, alongside the sister programs of Academic Community Engagement, the Common Reading Experience, and the university Writing and Communications Center. The director of Undergraduate Research, now reporting to the Dean of ALA, became one of the two volunteer faculty members who originally organized the student conference in 2004, with a half-release of teaching time to run the program.

The new Undergraduate Research Program articulated a mission to “Institutionalize, support and expand opportunities for undergraduate research and creative achievement; and to nurture amongst the academic community, across the disciplines, a culture of research and development, and the drive to advance the liberal education outcomes of undergraduate inquiry and critical and creative competence” (Undergraduate Research Program). The goals became the following:

- Develop the program, on an ongoing basis, building on the advisory council of key stakeholders
- Promote undergraduate research and creative works through activities, periodic events, and ongoing services to students, graduate fellows and academic faculty members
- Document undergraduate written, oral, and visual outcomes, faculty pedagogical experiences, and graduate fellows' mentoring reflections
- Reward exemplary performance and provide grants to support undergraduate research
- Evaluate program outcomes through continuous research and assessment

Alongside the annual conference, which in 2019 showcased the research and creativity work of over 350 undergraduates, the journal publication, and training workshops, the Undergraduate Research Program began offering travel grants to student presenters at academic conferences, and summer research internship grants to students accepted at research internships abroad. In the first year, the funding came from the Academy of Liberal Arts, but in the third year of the program, 2014, a new budget center was created with \$30,000. After an initial dip in funding, due to the inflation of the Egyptian Pound, the program budget was increased in 2017 to \$56,000, with budget lines for student grants, publications, professional development travel for the director, and event hospitality. In 2018, a new activity was added to the mandate of the program—an institution-wide writing competition in five different genres of writing: short story, the spoken word, graphic novel, scriptwriting, and podcasting. Two faculty members were appointed to manage the competition, and a \$100,000 budget was allocated for marketing, workshop tutor fees, and generous travel awards to writing camps for the winners in each of the five categories. The director and administrative assistant of Undergraduate Research were responsible for budget disbursement and monitoring. On a campus of a largely English as a Second-Language body of undergraduates, the Writing Competition was seen as a vehicle for enhancing the writing ability of students. The budget increase, though, did not extend to undergraduate research activity.

The challenges, therefore, remained the same—understaffing, poor marketing, sometimes faltering technical platforms, and, ultimately, insufficient funding. For a program whose scope was institution-wide, a more robust infrastructure was needed. The budget, though increased, still

could not cover the full costs of students accepted at prestigious conferences, such as the Institute of Electrical and Electronics Engineers (IEEE) and the Middle East Studies Association (MESA) conferences, and research internships at universities abroad, including Harvard, MIT, Princeton, and Leeds, amongst others. The Travel Grant for conferences or competitions, covered \$1000, and the Research Internship Grant covered \$1500 of expenditures. For students traveling to the United States, Canada, Australia, and other distant and expensive venues, travel and accommodation costs, especially for an extended one-and-a-half months or more for a summer internship, far exceeded the awarded grant. The result was that student grant awardees constantly sought supplementary funding from various offices on campus. Eventually, a shared google spreadsheet was created to monitor cost-sharing and centralize disbursement. This and other challenges were effectively addressed through forming strategic partnerships with other units on campus to expand and diversify UR activities, share the cost and workload, as well as align with the strategic goals of the university. When, in 2018, UR activities were aligned with the strategic initiatives of the Associate Provost for Research, Innovation and Creativity, the budget escalated the following year a full \$200,000. The undergraduate support grants, therefore, were adjusted to adequately cover travel costs, raising travel grants to \$1800, and research internship grants to \$4000. Grant types were increased to cover competitions, community-based research, and requests for research resources (Undergraduate Support Grants). The UR Program now, also, documents the work of students in a Newsletter for Undergraduate Research, and promotes a summer boot camp on “Writing the Research Proposal,” targeting undergraduates from public universities in Egypt.

STRATEGIC PARTNERSHIPS

The UR program is, incrementally, creating a culture of scholarship among the undergraduate community and the faculty. Through carefully conceived strategic partnerships with campus entities, the program has been able to widen its scope and increase its impact with low or no additional cost or time. Some important gains that have been achieved through collaboration with significant campus partners are:

- *UR Partnership with the Core Curriculum*

Working with the Core Curriculum Advisory Committee, the UR Program has ensured that the university core curriculum has made explicit learning outcomes that highlight research skills at every developmental level. These include critical thinking and reading, written communication, and information literacy at Freshman and Secondary level, and interdisciplinary and multicultural competencies at capstone level. This learning outcome reads as follows: “Students will engage in inquiry by integrating knowledge drawn from various disciplines and perspectives to address real-world problems and demonstrate a more nuanced understanding of different aspects of local, regional and global issues” (Core Curriculum, AUC). While not strictly based on the “Connected Curriculum” Framework, offered by Dilly Fung (2016), the new core learning outcomes build on Gadamer’s (2004 cited in Fung 2016) underlying philosophy of student development. Fung describes the philosophy as one “enabling students to develop themselves, both individually and in communities, through dialogue and through active, critical engagement within and across subject fields” (31). The Core learning outcomes, thus, ensure that research skills are developed in increasing levels of complexity, across courses, and throughout the progression of the core curriculum.

- *UR Partnership with the Department of Rhetoric and Composition*

To acquire adequate staffing, and to reduce the teaching-admin workload, the director of the Undergraduate Research Program, herself a faculty member in the department of Rhetoric and Composition, developed a RHET-designation capstone course that aimed to offer on-the-job research and writing experience. Students who enroll in the course (capped at 12 students) may be placed in different workplaces—businesses, nonprofits, publishers, or university offices—to participate, as nonpaid interns, in research activity and professional writing. When the director of UR teaches the course, all 12 students enrolled in the course intern with the Undergraduate Research Program. This is a win-win situation, with students gaining credit-bearing job experience, and the director merging teaching/admin time, and gaining the fruit of student labor. The students participate in program evaluation and research about Undergraduate Research, review grant and conference evaluations, participate in journal editing, develop promotional material for the program, and manage the newsletter.

- *UR Partnership with the AUC Career Center*

A partnership with the AUC Career Center helped create new opportunities for undergraduate researchers. With a budget to fund work–study students, the Career Center was able to create a new category of *research* work–study offerings, providing paid positions for junior and senior student researchers interning with department faculty and research centers on campus.

- *UR Partnership with the Library*

Partnering with the library boosted the Undergraduate Research Journal (URJe) profile, and expanded the panel of reviewers and editors. The library upgraded URJe into an ISSN-registered open access journal on OJS.

- *UR Partnership with AUC’s Center for Learning and Teaching*

After initially offering faculty a number of UR-focused workshops that were barely attended, the UR Program partnered with the university’s Center for Learning and Teaching (CLT). Given that the CLT offers certification for faculty attending professional development institutes, which are then reported on the Annual Faculty Report, the UR Program employed this incentive, offering a semesterly institute on “Integrating Undergraduate Research in and beyond the curriculum.” The number of faculty attendees multiplied, with almost 25 participants per session. Six of these faculty members, in 2018, continued to seek advisory on course-embedded undergraduate research, intentionally restructured their courses to embed research outcomes, and became informed advocates for undergraduate research.

- *UR Partnership with the Associate Provost for Research, Innovation, and Creativity*

In 2017, the Provost started an institution-wide event—the Research and Creativity Convention—to showcase AUC’s intellectual output: faculty, graduate students’, and undergraduate students’. The EURECA conference was invited to become a key component of this event. The shift accrued many gains, most important of which were marketing and funding. EURECA gained visibility at the senior administrative level, and was communicated across a wider scope, including the Board of Trustees, the university’s New York office, the alumni network, and the AUC community at large. The marketing strategy and costs were monitored and covered by the office of the Associate Provost for Research, Innovation, and

Creativity. The costs of promotional material, keynote speakers, and awards were also covered. Finally, a new award—the Grant Award for the Disciplines—was introduced. The awarded \$25,000 goes to a department that integrates UR in its mission statement, creates curricular and co-curricular opportunities to advance and support undergraduate research, and recognizes exemplary faculty mentors and advisors.

- *UR Partnership with the Office of the Provost*

Working with the Provost's Office to enhance opportunities for students working on faculty research, a supplementary incentive fund of \$1500 was added to the \$10,000 Faculty Research Grant, and made available to faculty who engaged undergraduate research trainees in their research work. The numbers of student beneficiaries are still quite small, ranging between 8 and 12 students per grant cycle.

- *UR Partnership with the University's Life Mentorship Program*

The Life Mentorship Program supports faculty members in serving as academic and entrepreneurship mentors to undergraduate students. A conversation with the program resulted in the expansion of the mentorship scope to include undergraduate research as well. Faculty research mentors, therefore, would receive an orientation to the philosophies and expectations for undergraduate research, and periodically meet to reflect on experiences, challenges, needs, and achievements. The Mentorship Program will award highly accomplished faculty, based on deliverables, such as coauthored papers, student presentations at international conferences, or student publications.

- *UR Partnership with AUC's Scholarship Office*

A partnership with the scholarships office considered a redescription of a scholarship program—Tomorrow's Leaders Scholarship Program, which impacts 12 students a year. The funding source requires that students engage in community work, and implement a community-based project. Integration with the UR Program resulted in a required research publication that is based on the project. Students present their research at the annual EURECA conference. Other scholarships are similarly being revisited, perhaps, to embed a research requirement for graduation.

- *UR Partnership with Student Organizations*

The best spokespeople for the services of the Undergraduate Research Program are students. The Student Union (SU), with its huge database of students and media outlets helps promote the activities and grant opportunities offered by the UR Program. The First Year Program (FYP), a student organization that supports freshman students, helps organize an end-of-semester presentation and award event for students presenting research posters for a First Year Research Experience (FYRE) competition. This year, 54 students participated in the competition.

AUC is unique in Egypt in its actively evolving vision to ingrain undergraduate research within the whole student experience—curricular, co-curricular, from first year to capstone, student-led and faculty-led, paid, credit-based, and voluntary, in the humanities and sciences, applied and theoretical disciplinary and interdisciplinary contexts. The funding, staffing, and infrastructural challenges help inspire conversation at the administrative level, and almost always culminate in heightened awareness and refined strategy for undergraduate research. Still, there is a gap between the administrative direction, and the deeply anchored beliefs within traditionally taught programs, which perceive undergraduate research and scholarship as secondary to the teaching mission of the faculty. The process of implanting a culture and shared vision in the departments will take time before undergraduate research becomes an institution-wide strategy.

CONCLUSIONS

The Egyptian undergraduate research experience is diverse. This brief overview surveys the strategy, infrastructure, activities, and challenges across public and private universities in Egypt, with a focus on the case of the American University in Egypt. The terrain has huge potential for expansion and development. Most universities explored in this study have yet to conceptualize a vision and strategy for integrating undergraduate research practices into both the curriculum and co-curriculum, describe the guidelines that govern adoption of this student-centered pedagogy, and create recognition systems for both the students and faculty mentors. Universities need to work on the spatial capacities and technology infrastructure—the labs, studios, funding, and institutional industrial and community partnerships. All need to invest in creating the culture on campus and building a shared vision amongst faculty and departments. The vision,

so far, is not consensual. It may be top-down, with senior administration adopting the national strategic goals for higher education and research, or bottom-up, with a handful of passionate faculty members, engaging students in their own research, and embedding student research in their classes. Ultimately, the students themselves need to identify with their role as scholars, taking ownership of the learning process, and developing a “scholar” persona—a major shift of identity that requires a change of attitude, responsibilities, and expectations. These are some preliminary perspectives on the landscape of undergraduate research at Egyptian universities.

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